LabLink

Laboratory Information from the Michigan Department of Public Health

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FROM THE DIRECTOR

Robert Martin, MPH, Dr.P.H.

EMERGING INFECTIOUS DISEASES

In the first issue of this information sheet, I alluded to the changing nature of public health and health care delivery in general. There are pressures for change due to economics, changing technology and changing patterns of disease occurrence. Although we in North America and Western Europe enjoy a relative freedom from infectious disease, we need to remember that the major cause of morbidity and mortality in the rest of the world (> 75% of the worlds population) is due to infectious diseases.

Dr. Calvin Kunin, of Ohio State University who is widely known for his work in antimicrobial kinetics, spoke recently at Michigan State University. He cited the emergence of resistant bacterial strains as becoming a major problem. The reasons for this are twofold: 1) inappropriate use of antibiotics in the United States where prescription is regulated; and 2) inappropriate use of antibiotics in developing countries where use is unregulated. In developing countries, one only has to visit the local pharmacy to buy an antibiotic and, as one might expect, only a few capsules are purchased at any one time due to expense. In developing countries, it has been found that antibiotics are taken for a variety of reasons unrelated to infections. The combination of overuse of new antibiotics in the United States and the improper and overuse of antibiotics in developing countries sets the stage for the development of major problems due to resistance. We are seeing increasing incidence of penicillin resistant strains of pneumococci in the United States.

Dr. Max Essex, Chair of the Department of Cancer Biology at the Harvard School of Public Health presented a seminar at Michigan State University on the development of subunit vaccines for HIV infection. Dr. Essex is the individual who first described HIV-2. Differences in the modes of transmission of HIV-1 in Africa and the United States have been established for several years. In the United States infection is primarily acquired via homosexual activity, IV drug abuse or transfusion with contaminated blood or blood products. The rate of new infection seems to be leveling off. In Africa infection is primarily acquired via heterosexual activity and infection rates continue to increase exponentially. It is only this year that a biological basis for these differences has been described. Dr. Essex points out that the HIV-1 sub-types common in the United States, referred to as sub-type B, has a tropism for cells of the immune system expressing the CD4 molecule (e.g., lyphocytes and monocytes). However, sub-types A, C, D, and E which are most frequently seen in developing countries have a tropism for the dendritic cells of the mucosal epithelium (Langerhans cells) and may involve a receptor molecule independent of CD4. The implication is that if these other sub-types were to become established in the United States, one would expect a sharp increase in infections due to heterosexual transmission. Clearly there is a need to be watchful for the introduction of these other sub-types which would affect a much different population than is currently associated with HIV-1 infection in this country.

A publication earlier this summer from the Department of Health and Human Services entitled, Emerging and Re-emerging Infectious Diseases, outlines the nature of the worldwide problem and steps that must be taken to address such issues both in the United States and in the world.

One such step has been taken to strengthen the public health infrastructure in the United States. The Centers for Disease Control and Prevention and the Association of State and Territorial Public Health Laboratory Directors have developed an Emerging Infectious Diseases Fellowship Program. The program offers two types of fellowships; one fellowship focuses on providing postdoctorate experience and another type focuses on providing training for individuals with bachelors and masters degrees. These programs involve spending three to four weeks at the Centers and then spending the remainder of the training experience at a host state public health laboratory. Both the postdoctorate training and the laboratory training programs offer stipends. For those interested, please call the Washington, D.C. headquarters office of ASTPHLD at (202) 822-5227.

MICHIGANS REGIONAL PUBLIC HEALTH LABORATORY SYSTEM

Frances Pouch Downes, Dr.P.H., Managed Care Coordinator

A statewide laboratory management system for local public health agencies assures the availability of testing services for local public health programs. Since 1992 the Michigan Department of Public Health Laboratory has provided leadership for testing performed in non-traditional laboratory settings like sexually transmitted disease clinics and cholesterol screening programs.

In 1987 a committee of the Michigan Associate for Local Public Health developed a plan for a regional laboratory system in Michigan. The committee determined that public health laboratories are an essential component of the public health delivery system and called for a statewide partnership between state and local public health laboratories to strengthen the quality and availability of laboratory services. The plan was not immediately implemented because no funding sources were available at the time. However, the pending implementation of the Clinical Laboratory Improvement Amendments of 1988 (CLIA 88) in 1991 made the development of the regional state laboratory system critical.

"Much of the testing done at the local public health level is not in the traditional laboratory setting. Because these test sites were not considered laboratories prior to CLIA, they were not subject to the same regulation as traditional labs. CLIA changed all that. Under CLIA, a facility performing testing on any specimen of human origin for diagnosis, prevention or treatment of any disease is considered a laboratory," said Dr. Barbara Robinson-Dunn, Chief of the MDPH Microbiology Section.

Most local health department laboratories lack the depth of supervision and access to quality assurance programs required by CLIA 88. The MDPH laboratory agreed to organize the local public health laboratories into regions and provide technical assistance and adequate quality assurance programs. Three county health department laboratories with highly-trained laboratory staffs and the Lansing and Houghton MDPH laboratories agreed to maintain CLIA certificate for public health laboratories in their geographical region. These assurances enabled neighboring local public health laboratories to qualify for a limited public health certification, which allows public health laboratories performing up to 15 waived and moderate tests at multiple test sites to obtain one certificate.

Currently, there are five Regional Laboratories covering 41 health districts. (Nine public health agencies do not participate in the regional laboratory system because they perform no tests, have fulfilled certification requirements independently or use a certified commercial laboratory.) MDPH personnel act as directors of the Regional Laboratories. Regional Laboratory staff or laboratory directors act as technical supervisors for all test sites within the region. Each test site identifies one site supervisor. Annually, about 500,000 tests are performed in the Regional Laboratory system. Tests most commonly performed include glucose, hemoglobin, wet mounts, pregnancy tests, Gram stains and cholesterol.

The cost of operation of the regional laboratory system is shared by all participants. Each region determines an annual assessment for health jurisdiction in that region. Costs for certification fees, communications, internal proficiency testing and training are shared.

"Without the Regional Laboratory system many smaller health departments would not be able to meet the costs of CLIA 88 personnel requirements," said Ken Terpstra, Kent County Laboratory Manager.

"The Regional Laboratory system is a win-win proposition for us. We are able to provide oversight for appropriate and quality testing, a state public health laboratory core function. We have been able to improve the quality of testing performed at the local level by standardizing procedures, providing proficiency testing programs and training testing personnel. Local public health programs are assured access to testing because the testing is performed closest to the site of service delivery," said Dr. Robert Martin, MDPH Laboratory Director.

Regional Laboratory	Participants	Technical Supervisor	Director
Region 1: Lansing	Ingham County Health Dept. Jackson County Health Dept. Lapeer County Health Dept. Lenawee County Health Dept. Livingston County Health Dept. Mid-Michigan District Health Dept. Monroe County Health Dept. Shiawassee County Health Dept. Washtenaw County Health Dept.	n/a	Dr. Barbara Robinson-Dunn
Region 2: Saginaw	Central Mich. District Health Dept. District Health Dept. #2 Huron County Health Dept. Saginaw County Health Dept. Sanilac County Health Dept. Tuscola County Health Dept.	Robert Jones	Dr. Robinson-Dunn
Region 3: Kalamazoo	Barry-Eaton District Health Dept. Berrien County Health Dept. Branch-Hillsdale-St. Joseph Health Dept. Cass County Health Dept. Kalamazoo County Health Dept. Van Buren County Health Dept.	Cindy Overcamp	Dr. Robert Martin
Region 4: Grand Rapids	Muskegon County Health Dept. Benzie County Health Dept. District Health Dept. #1 District Health Dept. #5 Grand Traverse County Health Dept. Ionia County Health Dept. Kent County Health Dept. Leelanau County Health Dept. Manistee-Mason District Health Dept. Mecosta County Health Dept. Mid-Michigan District Health Dept. Ottawa County Health Dept.	Ken Terpstra	Dr. Martin
Region 5: Houghton	Dickinson-Iron District Health Dept. Delta-Menominee District Health Dept. Marquette County Health Dept. Luce-Mackinac-Alger-Schoolcraft District Health Dept. District Health Dept. #4 District Health Dept. #3 Western Upper Peninsula District Health Dept. Chippewa County Health Dept.	n/a	Dr. William Sotille

Data and Specimen Handling

Steve Betterly, DASH Unit Supervisor.

The Data and Specimen Handling (DASH) Unit is part of the Quality Control and Specimen Acquisition Section. Our job is to receive and distribute clinical specimens and water samples for laboratory analysis, and to process and distribute completed laboratory reports. We also assist submitters in placing their specimen collection kit orders.

DASH is committed to providing the public with the best service possible. However, there are a few things submitters can do to help. Please use our new universal microbiology test requisition form (FB100) with submissions for the microbiology section. This new universal form improves the transfer of patient and specimen information into our new computerized system. The test request form must be completed by the submitting agency.

Separate specimens are particularly important when submitting requests for HIV, Hepatitis B and syphilis testing procedures. Please assist us in providing timely and accurate laboratory results by always sending a separate spun serum specimen with the appropriate test request form.

Whenever possible, please order specimen and water sample collection kits by fax at (517) 335-9871. You may fax us when it is convenient to you and we can process your orders during our non-peak hours.

You may direct any comments or questions regarding specimen submission and result reports by telephone: (517) 335-8059; Fax: (517) 335-9871; or E-mail: BetterlyS@SMTP.MDPH.STATE.MI.US

WATER ANALYSIS SECTION

Sandy Kerns, Production Manager

The Water Analysis Section provides bacteriological testing of water to both public and private drinking water supplies. The test provided for drinking water is a presence/absence analysis for total coliform and Escherichia coli.

The section also provides bacteriological testing for non-potable water, such as swimming pools and bathing beaches. These sources are tested for E. coli, fecal coliform and fecal streptococcus. The test for E. coli (EPA 600/4-85/076) is a new test offered since 1995. It is more closely related to the presence of human sewage than the test for fecal coliform.

Influenza Notes from the Virology Section

Louis Guskey, Ph.D., Section Chief, Virology

We are currently making arrangements with the Disease Control section to send out information on the new influenza season. Test kits are already on hand. These kits include slides, transport media, and directions for specimen submission. Submitters are urged to call Drs. Hall or Stobierski at (517)335-8165, or Dr. Guskey at (517)335-8099 for information on the isolation and identification of the influenza virus. As in past years, serological diagnosis will not be part of the program as the turnaround time is faster using the direct isolation/detection method.

NOTES FROM THE NORTH

Kirsten White, Laboratory Scientist

The Upper Peninsula Laboratory is located on the campus of Michigan Technological University in Houghton, Michigan. There are eight employees in the laboratory who perform a variety of tests for customers in the upper peninsula and the upper lower peninsula. Services include both bacteriological and chemical water testing, chlamydia, gonorrhea, and syphilis testing, serology for Lyme disease and a limited amount of clinical bacteriology.

A new service offered from the Houghton laboratory is Pulse-Field Gel Electrophoresis (PFGE). This is a molecular epidemiologic method that enables us to distinguish bacterial strains of the same species on the basis of their genetic material (DNA). PFGE replaces other methods of typing such as staphylococcal phage typing previously performed at the Houghton laboratory.

If any of you from the lower peninsula find yourself in Houghton, please stop in and visit. We are small, and friendly!

NOT JUST A POSTCARD

By Marilyn Boucher and Eleanor Stanley - Laboratory Scientists, Clinical Chemistries Unit

The Newborn Screening Laboratory in Lansing receives over 600 newborn specimens daily on special "cards" familiar to phlebotomists, newborn nursery personnel, and laboratorians. Demographic data is entered on the form and the blood specimen is collected on unique filter paper designed for that purpose. We test for seven congenital conditions; hypothyroidism, galactosemia, sickle-cell disease, biotinidase deficiency, maple-syrup urine disease (MSUD), congenital adrenal hyperplasia (CAH), and phenylketonuria (PKU). Two of these disorders, CAH and galactosemia, are life-threatening and require immediate clinical attention. Correct patient information and specimen quality are essential to ensure accurate and valid test results.

Over the last year we have noticed an increase in the number of unsatisfactory specimens, including problems with serum rings, clotting, and "layering" of specimens. We constantly evaluate these problems to keep them at a minimum. Phlebotomists, specimen handlers and laboratorians can help us by assuring acceptability before the specimen leaves the hospital. If a specimen appears to be a problem, it is best to redraw the specimen if possible. Once a child has left the hospital, it is often difficult to get a second specimen in a timely manner.

Some hints to assure specimen quality: 1) store cards in a cool, dry place; 2) do not handle the filter paper where the 5 circles are located; and 3) air dry the card at least 4 hours before shipping. When all precautions have been taken, and you are still experiencing a high number of unsatisfactory specimens, please contact Mr. John Naber (517)335-8931 in the Newborn Screening Follow-up Program for assistance.

VIROLOGY SECTION GOES RESPIRATORY

Cal Frappier, Lead Worker of the Virus Isolation and Rabies Unit recently attended a workshop at CDC entitled Laboratory Diagnosis of measles, influenza and other respiratory viral infections . The workshop was held at the CDC facilities in Atlanta, Ga., and was jointly sponsored by ASTPHLD. One individual from each state and territorial public health laboratory attended one session of this course.

The object of the six day training was to build the capacity of each public health laboratory to rapidly and reliably perform measles indirect IgG, measles capture IgM, and isolation and identification of influenza and other respiratory viruses. In addition to testing prepared samples, course participants created their own personal specimens from blood, saliva, throat swabs, and NP washes, so they could experience the proper technique of specimen collection and thus be able to relate that information to submitters.

The U.S. Public Health Service and the Pan American Health Organization have as their objective, the elimination of indigenous cases of measles from the U.S. by 1996 and from the Americas by 2000. This objective establishes a need to accurately determine the presence and characterization of suspect measles cases before the appearance of disease in secondary contacts.

Rapid and accurate identification of the other non-measles respiratory viruses will assist in:

- providing information to the patient and parents
- educating medical staff, especially pediatricians
- preventing further transmission of disease
- the usage of antiviral drugs
- reduction of unnecessary use of antibiotics
- epidemiological surveillance
- vaccine strain selection

Michigan is one of 110 laboratories in 79 countries which provide influenza isolates to the World Health Organization's Collaborating Centers for strain characterization.

Remember: Don't get Spots, get Shots

MALARIA IN MICHIGAN

The Bureau of Infectious Disease Control has been doing follow-up investigation of a case of malaria in a resident in Wayne County. This individual became ill in late August and was treated successfully for malaria at a local hospital. Epidemiologic investigation did not reveal any risk factors for malaria such as travel outside of the United States. This case is unusual because the patient was most likely infected in Michigan. The Centers for Disease Control and Prevention (CDC) is interested in this case of malaria and sent an EIS officer from their Malaria Branch to assist with the investigation. Stained blood films were submitted to the Microbiology Section for identification of malarial parasites which were identified as Plasmodium vivax. Because malaria is not indigenous to Michigan, the slides were sent to CDC for confirmation.

Follow-up activities included mosquito surveillance at potential exposure sites in southeast Michigan and laboratory and hospital surveillance for additional cases. Environmental surveillance revealed the presence of Anopheles mosquitoes. This appears to be an isolated case of endemic malaria. Speculation on a source focuses on acquisition (via mosquito transmission) from an untreated person in Michigan or from mosquitoes inadvertently arriving on an international airline flight. There has not been an endemic case of malaria in Michigan since the 1950's. This case emphasizes the necessity of being prepared for emerging infectious diseases.

Advice to the LabLorn...

Susan Shiflett, Training Coordinator

In September, I was lucky enough to attend the Midwestern Area Laboratory Training Alliance meeting in Skokie, Illinois. Training needs for the Midwest region of the National Training Network were discussed. All states attending agreed to co-sponsor four workshops in the coming year. The Michigan Department of Public Health, Division of Laboratory Services has agreed to the arrangement. Within the next year there will be a half day workshop on Laboratory Safety held in the Lansing area. There will also be a two-day workshop on "Good Laboratory Practices" to be given in three sites in the state.

The Michigan Department of Public Health and the National Laboratory Training Network are sponsoring a workshop on "Broth Culture Techniques for the Mycobacteriology Laboratory" on November 8, at the department complex in Lansing. If you did not receive a brochure for this workshop, and would like to be considered for a second workshop to be held in the spring, please phone me at (517)335-9763.

I have a small supply of the National Laboratory Training Network's "Training Resource Guide and Lending Library" catalog. The listings include the Clinical Laboratory Practice Series (CLPS), three of which come with CEU's, other laboratory training course packages, and management and self-improvement resources. If you would like a copy of this catalog, please call me at (517)335-9763.

This column is for you to use as a networking tool. Send any questions, comments, or concerns to me via the mail to: Susan Shiflett, Microbiology Section, Michigan Department of Public Health, 3500 North Martin Luther King, Jr. Blvd., P.O.Box 30035, Lansing, Michigan, 48909. I can also be reached on the internet at shifletts@smtp.mdph.state.mi.us. I am also on the CDC Wonder system for those of you that might want to reach me there.

Since the next issue of the LabLink will not be printed until January, I would like to take this opportunity to wish you and yours a wonderful holiday season, and best wishes on behalf of the Division of Laboratory Services at the Michigan Department of Public Health.

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